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ENTERPRISE DEVELOPMENT AND MARKET COMPETITIVENESS (EDMC)

ARMENIAN ICT SURVEY

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ENTERPRISE DEVELOPMENT AND MARKET COMPETITIVENESS PROJECT

ARMENIAN ICT SURVEY

AUGUST 12, 2012

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1. Executive Summary

The assignment No: AID-111-C-11-00001 entitled "Armenian ICT Industry Survey - Enterprise Development and Market Competitiveness Project (EDMC) in Armenia" - Revised Methodology and Growth Model, funded by, USAID was carried out by the consultant Mr. Madan Gopal Singh. The on-site mission in Armenia of the assignment was planned in two phases, the first from July 15th to August 16th, and the second from October 1st to November 1st, 2012. This report is for the first phase of the survey.

The main objective of this assignment is to support the Enterprise Incubator Foundation (EIF) in Redesigning the methodology of their annual ICT sector survey. The revised survey will provide better information for the State of Industry Report that is produced with analysis of sector statistics, specializations, turnover, export, workforce, legal and business environments, and other issues.

To obtain this objective the following studies have been carried out in Armenia:

- Review of the methodologies, statistical standards, and statistical classifications used for the regular surveys carried out in Armenia.

- Work was done with EIF on revising the existing methodology for implementation of the ICT industry survey, including:

  - Segmentation of the ICT industry into three sub-sectors:
    - Software Services,
    - Hardware Sales, and
    - Telecommunications.

- Development of a new sampling approach, in particular the design of a stratified (by activity, employment size, etc,) sample for country-wide survey implementation,

- Revision of the survey questionnaire (by segmentation like software, hardware and Telecom),

- Procedures used for data collection (by face to face interview),

- Refining the growth model; the existing model was compared with the EDMC baseline studies on the High Technology sector (HT) because of lack of data from the other sources,

- Developed instruments to capture data used in the growth model.

- Developed a sampling frame for the sample selection of enterprises from the list of enterprises listed by EIF and Spyur (yellow pages of Armenia).

In Armenia, the major sources of data collection for the ICT sector are the National Statistical Service (NSS) and EIF. The NSS compiles data for the macro level for the compilation of the national accounts and the EIF conducts the Annual Enterprise Survey for the software development services and the IT services in the country. Both agencies are using different classifications and methodology for the compilation of the ICT sector data; this has resulted in different results being published. For the NSS, the major source of the sampling frame is a business address register,

which is not yet fully developed, while the EIF has a complete list of the ICT enterprises registered with them. The EIF list is a more comprehensive and reliable list, which also provides information about the enterprises by economic activities. EIF follows classifications close to NACE 2 developed by the EU statistics, which is comparable with the OECD and ISIC revision 4. Due to the importance of the ICT sector for the Armenian economy, a reliable data source for turnover, expenditure, employment, and investment are required, which will be difficult to obtain. At present, only the EIF is producing the ICT on a regular basis

An attempt was made to compare the growth model by EIF from the data collected by the NSS but, due to differences in methodologies and classifications, this was not possible. Because of these differences in data, it was decided to compare the data for this assignment with the data collected under the EDMC baseline study for the HT sector.

The analysis of the data showed that the model used by EIF, developed by The McKinsey Consultancy Group, for data collected in 2006 and 2011, is working well with the 2011 data. However, it does require some refinements which will be carried out through the survey administered in September 2012 in the second phase of this assignment.

The survey will be conducted in three phases:

1. The first phase will focus on designing of the survey, preparation of instruments, sample selection, piloting survey, and training of field staff.

2. The second phase will focus on data collection from September 15th to October 14th.

3. The third phase, beginning in October 2012, will concentrate on data processing, data clearing, processing, and analysis.

Through a competitive tender process, the EIF will select and survey ICT subsector companies to conduct face-to-face interviews with approximately 150 top managers in all sectors. Interviews will be conducted to administer sector-specific survey questionnaires for the collection of baseline data. In addition to baseline industry information, the surveys also contain extensive questions about constraints effecting the growth of the industry. During the IT industry sample selection, 294 companies were identified, plus 50 for the hardware industry, from which a sample of over 50 percent of the overall identified population was extracted.

On the basis of the analysis completed on the ICT sector, a report will be prepared for publication. The first chapter provides the activities carried out during the first phase and plan for the second and third phase. The second chapter includes conclusions and recommendations.

2. Background information, Justification and Methodology

The Information and Communication Technologies (ICT) sector is one of the largest and most rapidly growing segments of the Armenian economy. The ICT industry is a leader in technological innovation, foreign investments, and workforce development. Both multinational corporations and newly created start-ups are successfully developing and growing their businesses in Armenia.

The Enterprise Incubator Foundation (EIF) is a business development and incubation agency supporting technology companies in Armenia. Their objectives are to improve the competitiveness of Armenian IT companies in the global marketplace, build linkages with business communities in key technology markets, improve local companies' access to knowledge and information on best practices and experience, and assist Armenian firms with attracting local and foreign investors. Since 2004, the EIF has been conducting annual surveys on a regular basis to cover key aspects of the industry including history, revenues, productivity, workforce, the educational sector, policy developments, etc. The survey is carried out with software companies and telecoms; hardware employing companies were not included in the sample.

Taking into account the sector growth and diversification as well as the need to incorporate a hardware segment, the objective of the assignment is to assist EIF and the EDMC Project to undertake a revision of the ICT industry survey methodology and ICT industry growth model by implementing the following activities:

1. Revision of the existing methodology for implementation of the ICT industry survey including:

    - Segmentation of the ICT industry into three subsectors: Software services, Hardware High Technology companies, and Telecommunications;

    - Development of a new sampling approach, in particular the design of a stratified sample for country wide survey implementation, and

    - Revision of the survey questionnaire.

2. Revision of the ICT sector growth model based on current trends of the worldwide ICT industry development. The model should be adjusted to each of the three subsectors - software services, hardware sales, and telecommunications - and reflect specifics related to a company's size, turnover, level of maturity, export, and return on investment (ROI).

3. Activities should fit with the EDMC Work Plan for the High Technology sector, as it ensures the compilation of essential and detailed sector data which is necessary for strategic policy development within the sector.

4. Preparation of detailed reports, including recommendations on survey methodology and the ICT growth model.

Statistical operations can separately investigate the supply of, and demand for, the ICT sector as well as ICT sector infrastructure and trade. From the supply side, the statistics are collected about the ICT sector, that is, the ICT manufacturing and services industries that provide the market with ICT infrastructure, goods, and services. The output of the ICT sector in terms of goods can be classified using the World Customs Organization's (WCO) Harmonized System (HS) and equivalent

national classifications. ICT services are mainly estimated using the International Monetary Fund's (IMF) Balance of Payments (BOP) classification which is rather broad and only captures transactions between residents and non-residents. The ICT sector is defined in terms of the UN's International Standard Industrial Classification of All Economic Activities (ISIC) and equivalent national classifications. Measurement from the demand side addresses access to and use of, the ICT sector by businesses, households, and government organizations.

Statistics covering an information society can be grouped into three thematic pillars: ICT supply, ICT infrastructure and ICT use. The first pillar describes the ICT sector and the supply of ICT; It defines which industries participate and how important they are for the national economy in terms of how many enterprises are involved and how many persons are employed as well as which types of products and services are produced and what the total turnover is. The EIF, through their annual surveys, collect information from the registered ICT enterprises in the country. Still, there is lack of data on investment and trade data which is required for the compilation of the national accounts.

The second pillar describes the technical infrastructure, including the penetration rates of the fixed and cellular telephone networks, the number of computers per inhabitants, and the number of Internet connections. It describes how ready a country is to become an information based society. This information is collected through administrative sources, such as ISP providers, directly.

The last pillar describes the demand side; who among enterprises and individuals is using ICT products and services? Which technologies are being used and why? And what barriers to a country's integration in the global information society can be identified? The information regarding the demand side is collected through household and enterprises surveys. The surveys are the responsibility of the NSS. According to a discussion with the NSS; they are in the process of conducting the next survey in 2013.

The basic idea is to improve the assessment of an information society in Armenia concentrated on developing some common methodologies for comparing international surveys that measure the use of ICTs in businesses, households, and governments. The first area for international harmonization was the diffusion of ICTs among enterprises and its use for various purposes, from sending e-mails and trading electronically (e-commerce), to the integration of ICTs into business processes.

2.1 Review of methodology

The following section describes the methodology used by the EIF for the annual survey on the ICT sector and also discusses the different sources used to collect data for the ICT sector in Armenia. The sector in Armenia is an important component of the national economy. Armenia is home to leading professionals and specialists of software services, applications development**,** quality assurance**,** business services**,** human resource management, and a multitude of other fields.

Despite the importance of the ICT sector in Armenia's and the world's economy, it is not a clearly defined industry according to the NACE Rev II (Statistical Classification of the Economic Activities by the EU). Instead, ICT is a component of multiple industries throughout the economy, including manufacturing, business services and telecommunications. In order to measure the ICT sector in an economy a satellite account is required. The measurement of ICT transactions is not an easy task, especially considering that computer software is an intangible asset. Therefore, it is important to examine and use international experience in order to provide guidelines and recommendations for the compilation of the experimental ICT satellite account for Armenia. The advantage of a satellite account is that it can isolate the ICT supply and demand in the various industries. It will define which industries and products and services are ICT specific and which industries and

products and services are not ICT related. The NSS is still in the process of developing a Supply Utilization Table (SUT) for all the sectors in the economy, but is not certain when it will be implemented. The lack of data has created a vacuum in data for the ICT sector.

2.2 EIF Annual Survey Methodology[1]

The EIF has been conducting an annual survey since 2004, collecting information on key aspects of the ICT sector, including history, revenues, productivity, workforce, education, policy developments, and others. The ICT industry survey is conducted during the months of September to October each year. The survey covers three groups: companies engaged in software development and IT consulting, internet service providers, and IT related faculties of major educational institution. The second group covers only software development and IT consulting firms. The survey includes a number of areas important to the development and growth of the industry such as the business and legal environments, the educational framework, human resources, managerial capacity, marketing channels, product development, and others. In 2010, the survey covered 140 software, IT consulting, and internet service firms.

The software and IT consulting segment of the information technology industry is defined as the cluster of companies engaged in software development and maintenance; the provision of software related services, consulting, and integration; the development of graphics, animation, and multimedia applications; chip and IP design; and the provision of engineering and R&D services. Internet services include companies offering mainly access to the Internet (wholesale and/or retail) through various channels; this does not include VoIP businesses or Internet cafes. While companies included in the research may engage in a number of other activities within the technology sector, the above two components generate the major share of the firms' revenues. Respectively, only software and ISP segments of those companies were used in estimating industry figures.

Local companies are defined as enterprises that have operations in Armenia, and at least 51% of their equity is owned by citizens or permanent residents of Armenia, or locally owned firms. Foreign branches or companies are defined as enterprises that have operations in Armenia, and at least 51% of their equity is owned by foreign citizens, residents, or firms.

The estimates of the variables are based on a model developed by The McKinsey Consulting firm in 2005, but according to sources, this model was developed after an empirical study of approximately 20 enterprises for the software development activity and financial accounting relations which were developed for the estimation procedure.

Industry revenues were estimated based on the number of employees and average salary levels, as well as non-wage related costs and respective profit margins. The EIF tested their assumptions against reliable revenue figures from several companies and they believe that their industry revenue estimates provide reasonable approximation to the actual amounts. Calculations do not include hardware and high-tech companies, nor do they include temporary donor-funded software projects for the government. The 2012 survey will include the HT companies in the sample.

Productivity was estimated based on the annual revenues per employee. Two sets of figures were calculated: one was based on the division of all industry revenues by the total workforce; the other was the annual revenue of each company per employee, which was then averaged for the total industry using revenues as the weight factor. While the second estimation provides a better picture

[1] Armenian Information Technology Sector, 2010 Annual Report

of the productivity, it complicates the forecasting of the industry's growth. Therefore, industry projections were estimated using the first set of figures. Productivity calculations were made only for software development companies because significant differences exist between these firms and ISPs in terms of how their revenues are generated.

Workforce was estimated, even though they did not have data from the industry, based on the average number of employees per company. Average figures were calculated using a sample of local and foreign companies, where the outlier companies were excluded. This method allowed the estimation of average employee quantities that better reflect the actual state of the industry.

For forecasting industry growth, it was assumed that the local and international demand for the products and services from Armenian companies remained consistent with supply, and, therefore, they did not consider directly the demand side for their forecast.

In all, 281 companies were surveyed in 2010, and, out of those, roughly 30% provided correct information on revenue, wages, expenditures, etc.

2.3 Methodology for Computer Software[2]

This section is based on other countries' experience in developing a methodology recommended by OECD. It is highly recommended in the long run to develop a methodology for Armenia; implementations may take up to three to five years.

The 1993 System of National Accounts (SNA)[3] recommends that computer software expenditure by producers must be recorded as gross capital formation expenditure rather than intermediate consumption expenditure. However, there are conceptual and measurement issues when recording software. The reason for these issues is inadequacies in accounting software, as well as the ways in which software is produced and copied under license. Another problem with the measurement of software is when software is packaged with hardware and sold as a package or bundle; most new computers and laptops purchased use this approach.

Software can be divided into two subsections; original software and reproduced software. Original software is created for the reproduction for packaged software, for sale, and for the creation of goods and services which can include other software. Software can be reproduced at a cost far lower than the initial production cost and can be forwarded or sold to other individuals. This makes the treatment of software in the National Accounts framework difficult. Generally speaking software will reach the consumer after a three stage process:

1. The software is first created; this is called the original software. It is regarded as an asset and should be recorded as a gross capital formation if it is used in production for longer than a year.

2. In the second stage, the original software is reproduced. The reproduced software can either be in a physical copy (DVDs or CDs) or it may be transferred over an electronic medium such as Internet. In Armenia, most of the software purchased is reproduced from an overseas original; this will be the case in Armenia for a majority of the software utilized. The wholesalers in Armenia generally reproduce the original overseas software by purchasing a 'license to reproduce'.

[2] OECD paper on the development of software
[3] Manual SNA93 report on National Accounts

3. The third stage of the process involves the user of the software acquiring a 'license to use' the reproduced software.

An OECD task force recommended the following: In practice, business reports on software capitalization underestimate software capitalization and may be affected by changes in tax regulations and business practices. As a consequence, it is recommended that member countries develop an estimate of gross fixed capital formation in software independent from the estimate derived from the business reports on capitalized software.

In Armenia, the National Statistical Service does not have as many ICT related surveys and there are also no exclusive ICT related surveys being performed at present.

The purpose of this document is to:

- Examine international best practice in the development of ICT satellite accounts, and to establish recommendations based on these international experiences for Armenia;
- Explore the internationally recommended classifications used in the ICT sector, and link these classifications used to the Supply and Use tables (SU-tables) for Armenia which were compiled in accordance to the 1993 SNA;
- Examine the ICT tables for Armenia's ICT satellite account; and
- Explore the data sources required, and current data gaps in the compilation of the draft experimental ICT satellite account for Armenia.

To develop a satellite account is a long term procedure as it requires significant resources and surveys to obtain the required data, which is mainly carried out by the National Statistical Offices who have more access to the data from different sources.

2.4 Information and Communication Technology sector classifications[4]

This section provides the information about the classifications used for the ICT sector in Armenia based on the NACE 2.[5]

The sample design and size for ICT sector surveys will be determined by several factors, including the level of detail of output required. In this context, it should be noted that EU statistics collects the core indicators for the ICT sector at the most detailed level (4-digit) of the NACE 2, as shown in Table 1.

The following definition is used to identify ICT economic activities (industries): “The production (goods and services) of a candidate industry must primarily be intended to fulfill or enable the function of information processing and communication by electronic means, including transmission and display.”[6]

[4] All observations that are to be described in terms of statistics require systematic classification. Classifications partition the universe of statistical observations into datasets that are as homogeneous as possible with respect to the characteristics of the object of the statistical survey.

[5] NACE is the acronym used to designate the various statistical classifications of economic activities developed since 1970 in the European Union. NACE provides the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g. production, employment, national accounts) and in other statistical domains

[6] EU Statistics Methodology

This categorization of ICT goods allows statistical offices to produce output statistics on the production of goods and on import/export.

This definition has allowed statistical institutes to use existing structural business statistics—such as employment, turnover, wages and salaries, and added value—to assess the size and structure of the ICT sector.

The list of ICT industries (NACE 2) that meet this condition is provided in the table below.
Presently the NSS is following NACE 2 in its quarterly/annual surveys[7]. The EIF is also following NACE 2 in the annual surveys on the ICT sector. In this regard the EDMC Project is also using NACE 2, so that the data from the 2012 ICT survey can be linked to the HT sector. The harmonization of classification can be used for international comparisons.

ICT sector definition based on NACE[8] rev. 2 classifications:

The ICT sector consists of all enterprises/units (including both natural and legal persons) whose principal activity (principal activity contributes 50 or more percent to the value added) belongs to the following divisions and classes of NACE rev. 2 classification:

1. Manufacturing of computer, electronic, and optical products

This division includes the manufacturing of computers, computer peripherals, communications equipment, and similar electronic products, as well as the manufacturing of components for such products. Production processes of this division are characterized by the design and use of integrated circuits and the application of highly specialized miniaturization technologies.

The division also contains the manufacturing of consumer electronics, measuring, testing and navigating equipment, irradiation, electro-medical and electrotherapeutic equipment, optical instruments and equipment, and the manufacturing of magnetic and optical media.

- Manufacturing of electronic components and boards – group 26.1
- Manufacturing of computers and peripheral equipment – group 26.2
- Manufacturing of communication equipment – group 26.3
- Manufacturing of consumer electronics and related media (groups 26.4, 26.8):
    - *Manufacturing of consumer electronics – group 26.4*
    - *Manufacturing of magnetic and optical media – group 26.8*

In Armenia groups 26.4 and 26.8 are not used

2. Wholesale of computers, computer peripheral equipment, and software

This class includes:
- Wholesale of computers and computer peripheral equipment and
- Wholesale of software.

[7] EU statistics NACE 2 classifications

[8] NACE is the acronym used to designate the various statistical classifications of economic activities developed since 1970 in the European Union. NACE provides the framework for collecting and presenting a large range of statistical data according to economic activity in the fields of economic statistics (e.g. production, employment, national accounts) and in other statistical domains.

This class excludes:

- Wholesale of electronic parts, 46.52.
- Wholesale of office machinery and equipment, (except computers and peripheral equipment), 46.66.

ICT trade industries:

- Wholesale of information and communication equipment – group 46.5

In Armenia, group 46.5 is included in its classifications.

3. ICT services industries:

Telecommunications

This division includes the provision of telecommunications and related service activities, which includes transmitting voice, data, text, sound, and video. The transmission facilities that carry out these activities may be based on a single technology or a combination of technologies. The commonality of activities classified in this division is the transmission of content, without being involved in its creation. The breakdown in this division is based on the type of infrastructure operated.

Telecommunications – division 61:

- Wired telecommunications activities – group 61.1
- Wireless telecommunications activities – group 61.2
- Other telecommunication activities (groups 61.3, 61.9):
  - Satellite telecommunications activities – group 61.3
  - Other telecommunications activities – group 61.9

ICT services industries (division 62; groups 58.2, 63.1, 95.1): Computer programming, consultancy and related activities

This division includes the following activities related to the provision of expertise in the field of information technologies: writing, modifying, testing and supporting software; planning and designing computer systems that integrate computer hardware, software and communication technologies; on-site management and operation of clients' computer systems and/or data processing facilities; and other professional and technical computer-related activities.

- Software publishing and IT service activities (division 62, group 58.2):
- Software publishing – group 58.2;
  - Computer programming, consultancy and related activities – division 62;
    - class 62.01 – Computer programming activities;
    - class 62.02 – Computer consultancy activities;
    - class 62.03 – Computer facilities management activities;
    - class 62.09 – Other information technology and computer service activities;
- Data processing, hosting, and related activities; web portals – group 63.1;
- Repair of computers and communication equipment – group 95.1.

The following table is based on the activities included in Armenia's classifications:

Table 1: ICT NACE 2 Classification by group and activities used in Armenia

ICT manufacturing industries
26.10 Manufacturing of electronic components and boards 26.11 Manufacturing of electronic components 26.12 Manufacturing of electronic boards 26.20 Manufacturing of computers and peripheral equipment 26.30 Manufacturing of communication equipment
46 ICT trade industries (46,5)
46.51 Wholesale of computers, computer peripheral equipment, and software 46.52 Wholesale of electronic and telecommunications equipment and parts
58 ICT services industries (58.2)
58.20 Software publishing 58.21 Publishing of computer games 58.29 Other software publishing
61 Telecommunications (61.1)
61.10 Wired telecommunications activities 61.20 Wireless telecommunications activities 61.30 Satellite telecommunications activities 61.90 Other telecommunications activities
62 Computer programming, consultancy, and related activities
62.01 Computer programming activities 62.02 Computer consultancy and computer facilities management activities 62.09 Other information technology and computer service activities
63 Data processing, hosting, and related activities; Web Portals (63.1)
63.11 Data processing, hosting, and related activities 63.12 Web portals
95 Repair of computers and communication equipment (95.1)
95.11 Repair of computers and peripheral equipment 95.12 Repair of communication equipment

One of the major problems with the ICT sector is the constant changes to ICT products. They require regular updates to keep the definitions fresh.

2.5 Proposed Methodology

Business Model

Labor productivity is commonly measured either as value added per employee or sales per employee. Outside the context of empirical models, value added is a more precise measure of labor productivity since it subtracts from the value of sales the costs incurred with intermediate consumption. Firms with foreign capital participation seemed to have higher labor productivity. Labor productivity regresses with factor inputs (capital, labor, spending on materials). To check validity of this model there is a need to carry out a study where one can find the relationships between variables to develop a relevant model.

As mentioned the McKinsey Consulting firm conducted a study on IT under EIF in 2005. The CAPS IT survey, on the other hand, is more focused on providing information on company level technical assistance needs. This survey also achieved a high response rate in the acquisition of certain financial and employment data, which can be used in the monitoring of the government program and by the industry at large for statistical purposes. From their study, they developed basic accounting relations which can be used in the annual surveys. These relationships are based on labor salaries/wages, and other relevant variables. Wages are a high component of operating expenses. Based on these indicators, it is possible to derive the required information to find turnover for software activities.

It was found that salary and wages account for 80% of operating expenses. Profit was estimated to be 40% of expenses based on total turnover and calculated as operating expenses plus profit. These relationships have been used since 2005. Since 2005, the software industry has gone through many changes. In order to accurately revise these, a new empirical study or survey to obtain more accurate financial indicators, must be completed.

To refine the growth model, an attempt was made to compare the findings of the model used by the EIE with the baseline studies carried out by the EDMC Project. The focus was on different surveys on HT sectors in 2006 and 2011, with special reference to the software development and communication activities.

The USAID (CAPS) BDS Needs Assessment and Baseline Data Survey was carried out in 2006. For this purpose the Economy and Values Research Center was selected to conduct face-to-face interviews with approximately 50 top managers in each of the three sectors. Interviews were conducted by economics students specially trained to administer sector specific survey questionnaires to be used as baseline data. In addition to baseline industry information, the surveys also contained extensive questions about potential services which would assist each industry to grow and develop. During the IT industry survey process, they identified 184 companies from Yerevan and the Marzes, actively engaged in the provision of products or services normally associated with the information technology industry; they selected the sample of 49 enterprises. As shown in Table 2 below, the indicators used by the EIF for the present survey were used to estimate ratios based on the CAPS research carried out in 2006. This has been further verified by the 2011 EDMC Project survey on High Tech industries for the software industry.

Table 2: Comparisons of Estimates[9]

	Salary and Wages AMD (million)	Other Expenses AMD (million)	Total Expenses AMD (million)	Profit AMD (million)	Turnover AMD (million)	Ratio of Salary to Total Expenses %
Based on EIF estimates	2.2	1.8	4	1.6	5.6	55.0
Based on CAPS Actual Data (2006)	2.2	2	4.2	2	5.2	52.0
Survey analysis: Embedded software and parallel systems VC (2011) DRC EDMC	267.9	217	484.9	194	686.7	55.2
By using EIF ratios	267.9	214.3	482.2	193.2	675.4	55.5

The data generated by the EIF was compared with other countries. It is challenging to compare data on the ICT sector across different countries because very few countries have comprehensive data on the ICT sector. As can be seen in Table 3, there is not much difference between Armenia, Canada, and Australia, but for Bulgaria, the number is low due to a low level of a software development industry. The estimate for Armenia is based on data from 2005, and the other countries on data from 2010.

Table 3: Comparisons for the ratio of salary/wages to total operating expenses by nations[10]

Armenia	55 %
Australia	44 %
Canada	48 %
Bulgaria	28 %

The ratio of salary and wages are compared to Canada, Australia and Bulgaria. This shows that the model used by the EIF is providing a reliable data set. On the basis of this, we suggest that the growth model developed in 2005 be used for the regular annual surveys; however, it is recommended to carry out a baseline survey in September 2012 to develop a new growth model with additional financial and economic constraints variables to determine their impact on the ICT sector performance. Based on the findings of the survey, the model will be appropriately revised.

As mentioned earlier, the basic approach involves a production function (F (.)), which relates output, Y, to inputs. One of these inputs is capital; the components of capital are IT capital (denoted C), and non-IT capital K (which includes, for example, buildings). There are also additional factors of production including hours of labor L, and materials M.
$Y = AF(L, K, C, M)$.

The key determinants of turnover can be analyzed using regression analysis of production functions which link revenue to labor inputs, investment, and other production inputs. The

[9] 2011 USAID Enterprise Development and Market Competitiveness (EDMC) Project

[10] Based on the Annual reports of these countries.

coefficient estimates are elasticities assuming if the variables are expressed in logs. For this, the basic results incorporate dummy variables for economic activities such as software development, etc. as well as dummies for the labor size categories. The effects of the dummy variables are captured and the coefficient estimates are generated which represent percentage changes in the value of output or productivity. The information on these variables to be used in the model will be collected thorough the survey. Based on the analysis of the survey results, estimates will be compared with the model developed by The McKinsey Consultancy firm in 2005 and the model will be revised accordingly.

From the survey analysis, cross tabulations will be generated to establish the relationship between key variables including value added by employment size, year of enterprise establishment, sub-sectoral focus, financial constraints, etc.

The enterprises are classified according to micro, small, medium, and large, and by employment size using the same criteria used by the NSS, which is shown below in Table 4.

Table 4 provides the information about revenue by employment size; about 60% of revenue is generated by large enterprises, and based on this, all large enterprises will be selected with a probability of one and the remaining 25% of the total will be selected with the probability proportional to employment size. The sampling methodology is explained in the next section.

Table 4: Revenue by employment size[11]

	Employment Size	Revenue	Number of Enterprises	Average Revenue per Enterprise	% of Total Revenue	% of Total Enterprises
Micro	1 - 5	8,053,211	52	154,869	4.6%	22.1%
Small	6 - 15	35,911,618	110	326,469	20.6%	46.8%
Medium	16 - 30	29,589,928	41	721,706	16.9%	17.4%
Large	31 +	101,031,149	32	3,157,223	57.9%	13.6%
	Total	174,585,906	235	742,919	100.0%	100.0%

Source: 2010 EIF Survey on ICT

2.6 Survey Proposal

To develop the methodology for the growth model, it is recommended to conduct an annual survey for the ICT sector covering manufacturing (HT & engineering), service (software development, computer and data processing activities, wholesale, assembling, and repairing services) and enterprises in Armenia. The objective of this survey will be to collect data required to produce relevant economic statistics for the ICT sector. Survey estimates will be made available to businesses, governments, investors, associations, and the public. The data will be used to monitor industry growth, measure performance, and make comparisons with other data sources to better understand this industry and its performance.

Scope and coverage

- Include all ICT sector economic activities based on NACE 2, excluding retails and media;
- Business size based on number of employees. According to the NSS, the manufacturing sector enterprises are classified as follows based on employment size:

[11] Exclude ISP providers' enterprises.

1 - 5 Micros
6 - 50 Small
51 - 100 Medium
101 + large

Service sector:

1 - 5 Micros
6 - 15 Small
16 - 30 Medium
31 + Large

For the manufacturing sector in the ICT, all companies with more than 100 employees and for the services sub-sector all firms with more than 31 employees will be assigned a probability of one (signifying automatic inclusion).

2.7 Survey Design

The survey will be conducted by the EIF. The survey company will be selected by a competitive bidding process. The EDMC (HT) consultant designed the questionnaire with input from EIF and t EDMC technical specialists, and identified the information communication technology industry population, constructed a sample frame, and derived the sample. The questionnaire will be translated into Armenian before the survey is conducted on September 15th. The questionnaire will be tested on industry members during the in-person interviews. The data will be provided to the EDMC Project for analysis and production of the final report.

Defining the ICT Industry

For this analysis, the European Commission's[12] definition of the information technologies industry was used: The ICT industry was defined as a group of companies involved in activities, such as provision of "services, applications, and technologies, using various types of equipment and software, often running over telecom networks". For some of the analysis, firms were aggregated into segments based on their indication of primary product or services. According to the European Commission, the importance of ICTs lies less in the technology itself than in its ability to create greater access to information and communication in underserved populations.

Although the segments are broad, aggregation of results allows more reliable statistics. The following segments were used, based in part on the Enterprise Incubator Foundation's ICT sector report[13]. In the final analysis the activities will be grouped according to the NACE 2 classification.

1. Software development, its maintenance, and related services provision for clients (web design; business applications, database management, etc);

2. Graphics, animation, and multimedia applications development;

3. Chip and IP design;

[12] European Commission, Communication from the Commission to the Council and the European Parliament, Information and Communication Technologies in Development. The Role of ICTs in EC Development Policy, Brussels, 14.12.2001, COM(2001)770 final
[13] 2010 EIF Annual Report

4. Consulting and integration;

5. Internet service providers;

6. Telecommunications networks;

7. Other (business incubator, certification, industrial automation tools, etc.);

8. Trade, wholesale and repairing.

Population Design

The following sources were used to identify companies operating in the ICT industry.

1. The latest dataset of the Enterprise Incubator Foundation on software and IT service sectors;

2. Spyur: Yellow & Business Pages of Armenia; the leading and the most comprehensive database of existing legal entities (www.spyur.am).

The regional IT companies that are involved in merely wholesale/retail trade of computers are not included in the population since they are mainly dealers of Yerevan-based Internet providers, providers of computer literacy trainings, system integrators of related activities, etc. Only one regional company was identified as a non-branch Internet service provider. The players in the IT market registered as foundations and/or NGOs are also not included in the population.

About 298 firms were identified by the EIF with the following sector distribution (the total will not add up to 298 due to multiple activities by some of these enterprises).

For software development, 51 enterprises with more than 31 employees were selected with probability of one; the remaining 30% were selected with probability proportional to the employment size.

Probability proportion to size is a sampling procedure under which the probability of a unit being selected is proportional to the size of the ultimate unit: Sampling with Probability Proportional to Size.

Sample designs with PPS are often used in business surveys when it is particularly important to include the largest firms in an industry in the sample, since they contribute a large share of the industry's overall production of goods or services.

For the ISP, all 32 enterprises were selected, and for hardware, large enterprises will be selected with a probability of one; the remaining 30% were selected randomly as no employment data was available. The sample weights by subsector will be constructed in aggregated data to be sure these large firms will not skew the results.

Table 5: Distribution of the enterprises by activity

	Population	Sample
Accounting, banking, and financial software	29	4
Chip design, testing, and related elements	16	3
Computer graphics, multimedia, and games	26	4
Customized software and outsourcing	82	10
Databases & MIS	33	6
Internet applications and ecommerce	39	7
ISP	32	32
IT services and consulting	72	8
Networking systems and communications	43	7
Web design and development	79	10
Hardware	101	25
Other	33	8

The survey did not identify non-registered groups/individuals involved in foreign outsourced contracts or serving orders of private clients in Armenia[14].

Data collection (Phase II)

Interviews will be conducted between September 15th and October 15, 2012. The interviews will take an estimated 30 minutes and most will be conducted in Armenian. A team of approximately 15 field staff will administer the questionnaires. The enumerators will be provided with extensive two-day training by the hired survey company for proper administration of the questionnaire and handling of respondent questions. Pilot interviews will be conducted to test the questionnaire instrument by the end of September 2012. This will be adjusted slightly prior to the final implementation.

The survey will involve extensive pre-interview recruitment of industry executives to participate in the survey. Respondents will be provided with a description of the ICT survey and an introduction to the survey. Nearly all respondents will be provided with the questionnaire on the day of the interview. The following activities will be done during phase III of the survey:

Editing and coding

Each questionnaire will be edited to generate the final questionnaires pertaining to the enterprise. Technical coefficients such as ratios of value added to gross output and compensation of employees to value added, with respect to each activity, will provide useful controls on the reported data.

Error detection

Data will be examined for inconsistencies and errors using automated edits coupled with analytical review. Where possible, data will be verified using alternate data sources.

[14] Two patterns of development can be expected regarding informal groups: (1) they will continue to work in an informal setting mainly for outsourced contracts, (2) they will enter the formal market by joining new startups or existing companies, since the labor pool is limited and with foreign-based companies entering the ICT market and established ones expanding their activities, the wages will likely increase.

Imputation of missing data in ICT surveys

If re-contacting the interviewed business is proven difficult for cost or time reasons, item non-response can be treated by mathematical techniques for data imputation. Imputation consists of assigning a plausible value to a question for which the selected unit has not provided a response, or to a question whose answer is logically or arithmetically inconsistent with answers in the rest of the questionnaire. It is important to recall that imputation does not intend to establish a "true" answer, but to assign a value for a missing answer that is consistent with the rest of the questionnaire. Frequently utilized methods for data imputation in business surveys are deterministic imputation, using "hot deck" and "cold deck" techniques. These techniques are explained below. The choice among them should be in accordance with the current practice for other business surveys in the statistical office, and these should be reviewed before selecting one method for surveys of the ICT sector.

Deterministic imputation of missing data consists of assigning a valid answer by means of the application of fixed rules that relate questions' values to each other. Under the same conditions, the mechanism will always generate the same imputed value. For each business with item non-response, the hot deck procedure searches a set of businesses with similar characteristics, called "donors" which are those who have responded to the item. The method consists of randomly selecting one of the donors, and assigning the answer of the chosen donor to the business with item a non-response. The hot deck procedure is one of the most frequently used methods of imputation and its main operational problem is how to delimit the set of donors, i.e. which variables determine that two units are "similar". A very restrictive rule will produce few donors (or none). Variables size and areas of economic activity should generally be used to define similarity. Additionally, basic ICT variables such as the use of computer, use of Internet and presence of a website, should be used to identify donors where the missing answer relates to those variables (e.g. refer to the relationship in the example above where use, or non-use, of the Internet is used as a criterion for a donor).

The cold deck procedure is similar to hot deck imputation, except that the donors are not actual survey responses, but rather logical combinations of responses that are constructed (often on the basis of experiences learned from past surveys). In addition to the weaknesses associated with the hot deck method, this approach requires additional information on which the construction of a donor table would be based.

Other imputation methods are mean (for quantitative variables) or modal (for qualitative variables) value imputation. This method consists of imputing the mean or the modal (i.e. most frequent) value of the set of donors. As mentioned in the 2010 EIF survey, 70% of the values were missing and, in under such circumstances, a model based approach probably represents the best solution.

Estimation

As part of the estimation process, survey data is weighted and combined with administrative data to produce final industry estimates.

Data processing and analysis

The CSPro software developed by the Bureau of Census (Washington, D.C.) will be used for data entry, editing, and SPSS will be used for data analysis.

3. Conclusion and Recommendations:

1. In relation to the requirements for effectively recording/tracking statistical data on software industries as recommended in SNA93, the NSS has not developed a satellite account. This

is mainly due to lack of required statistic information. NSS is in the process of developing the needed data supply and utilization table but that effort may take three to five years to complete.

2. It is recommended that the NSS and the EIF strictly follow NACE 2 data gathering/analysis standards for the ICT sector. In the EIF survey to be conducted in September 2012, NACE 2 will be used for applying classifications for economic activities covering the software development, hardware (wholesale, assembling, and repairing), and telecommunication sectors.

3. The NSS is developing a business register based on NACE 2 classification standards as suggested by the EU statistics office. In this regard, the information on turnover by economic activities is normally obtained through the business register, which in turn is typically compiled through tax offices. The tax offices are supposed to use the same classification scheme, but in Armenia, this has not yet been implemented. Due to the absence of the proper business address register, it is difficult to obtain a reliable sampling frame for the ICT sector.

4. The EIF has a complete list of ICT enterprises registered with them. However, the list contains the enterprises responsible for software development and communication it does not include the list of hardware enterprises. The EDMC Project, with the coordination of EIF, has developed for the 2012 ICT survey, a list of hardware industries through Spyur (yellow and business pages of Armenia), which will provide this information for the hardware sector. It includes the sub industries of assembly, wholesale, and repair within the ICT sector.

5. There is currently little coordination of data between different agencies collecting information in Armenia. As a result, it is difficult to validate the accuracy of the data generated by these agencies.

6. The NSS is planning to undertake an ICT survey from the user perspective; which will be conducted next year.

7. No data is available based on employment size and business activities; most of the data available is classified by economic activity; however the classificatory scheme utilized is not consistent with the latest internationally accepted industrial statistical classifications.

8. The EIF terms of reference call for the development of a new growth model for the ICT sector. The current model was developed in 2005 by the McKinsey Consultancy group. It is based on business accounting relationships, which were estimated in 2005. The existing model was tested with the recently collected company data through DRC analysis. The statistical relationships established in 2006 is still seen to be valid. In order to refine the model, additional information needs to be collected, which is not available through regular statistical data channels.

9. In Armenia, as in other developing economies, the availability of ICT indicators is still scarce, even though governments, civil society, and the business sector explicitly recognize the urgent need for this information. Therefore, many developing economies are preparing ICT-related policies and strategies without effective availability/review of statistical evidence. Reliable and timely indicators on the ICT sector are urgently needed to inform both industry participants and policy makers regarding ICT employment opportunities and constraints.

10. The Data collecting agencies in Armenia should coordinate their activities more effectively and facilitate cooperation among data users by fine tuning their joint understanding of the relative demand for different types of ICT statistics through contacts with, and feedback from, data users.

11. It is strongly recommended that at least one staff member of NSS be provided external training on statistical data gathering/analysis methodology for an extended period of time in order to help improve the quality of the annual surveys.

4. APPENDICES

4.1 Questionnaire on Software

Software Development Services

Company name	
Director	
Address	
Phone	
E-mail	
URL	
Year of company's establishment	Year ☐☐☐☐

1. Reporting period From .....to.....

2. Does the company have foreign shareholders**?** ☐ ☐ **Yes** **If** No, go to 4

3. What is the foreign ownership share in the total equity capital in your company (in %)?

Country 1		Country 2		Country 3	
	%		%		%

Activities of establishment

Main business activity

4. Please describe the activity/ nature of the enterprise based on the service rendered:

_____

_____

_____

5. Please check the **three major activities** for the Software Development Services and the percentage share of revenue these represent.

	Activity	Check Activity	Percentage Share of total revenue generated
I	Chip design, testing and related		
ii	Databases, management systems and automation		
iii	Internet applications and e-commerce		
iv	Networking systems		
v	Financial software (accounting, banking, etc.)		
vi	Web design and development		
vii	Customized software		
viii	Computer graphics, multimedia and games		
ix	Mobile applications development		
x	Other , Please Specify		

Employment

6. Kindly provide the information regarding persons involved as of September 2012

Employment status		Male	Female	Total	Average Number of Experience (Years)	Average Wages per Month AMD
Owner/Director						
Employee i) Management Staff						
ii) Technical /Professional Staff	Masters Degree and Higher					
	Bachelors Degree					
	Secondary/Vocational					
	Under Study/Student					
iii) Supportive Staff						
Part-time Staff						
Contracted Staff						
TOTAL Employees						

Sale of services

7. Please i**nclude** income from the main activities rendered such as software consultancy and supply services, hardware consultancy services, data processing services, database activities. **Exclude** items such as interest income, dividends, subsidies, government grants, donations, financial leasing, bad debts recovered, insurance claims, gain on sales of assets and foreign exchange transactions. These items should be reported under number 8.

AMD	

8. Please provide information regarding other income (include items such as interest income, dividends, subsidies, government grants, donations, financial leavings, bad debts recovered, insurance claims, gain on sales of assets and foreign exchange transactions).

AMD	

9. TOTAL INCOME (7+8)……

AMD

10. What is the export share in total revenue in % (question 9) ?

11. Please name the 3 main export countries and their share (%) in total export.

Country 1		Country 2		Country 3	
	%		%		%

EXPENSES

12. Total Salaries & Wages of Employees including benefits such as Social Tax etc.	AMD	
13. Professional and business services fees (e.g., legal, accounting)	AMD	
14. Subcontract expenses (**include** contract labor, contract work and custom work).	AMD	
15. Office supplies, utilities, and telecommunications expenses (**include** gas, heating, hydro, water, telephone and Internet expenses).	AMD	
16. Rental and leasing (**include** rental of premises, equipment, motor vehicles, etc.)	AMD	
17. Advertising, marketing, and promotions	AMD	
18. All other, please specify	AMD	
19. Total expenses (sum of questions 12 to 18)	AMD	

20. Capital Expenditures

a. Purchase of software (including upgrades)	AMD	
b. Purchase of hardware (including upgrades)	AMD	
c. Software development	AMD	
d. Other capital expenditure (like office space etc.), specify	AMD	

Total Capital Expenditures (a+b+c+d)……

AMD

Innovation, research and development and other

21. Kindly estimate the percentage (%) of total revenues generated by new or substantially improved products or services introduced by your firm **during the three-year period 2010-2012**

22**.** Of your total expenses, please estimate the percentage (%) related to product research and services introduced by your firms.

%

Factors Impeding Growth

23. Kindly provide the information to what extent will the following factors impede the growth of your ICT services or goods?

	Impediment					Does Not Apply
	Low				High	
	1	2	3	4	5	6
Access to financing						
Strength of competition (e. g dominant companies in the market)						
Government rules and regulations (Customs)						
Government rules and regulations (Taxes)						
Access to industry support (e.g. industry association or government agency)						
Delays in obtaining facilities from backbone supplier						
Delays in obtaining customer's decision to purchase						
Data and transaction security						
Lack of qualified staff						
Staff turnover						
Ability to attract qualified personnel						
Access to international markets (e.g. tariffs, exchange rate)						
Other (please specify)						

24. How did your business develop in 2012 compared to 2011?

	Increase	**Remain the Same**	**Decrease**	**Don't know**
Output	☐	☐	☐	☐
Turnover	☐	☐	☐	☐
Profit	☐	☐	☐	☐
Number of Employees	☐	☐	☐	☐

25. Did you have some new investment for last year? 1 yes, 2 no (if no skip to Q26) ☐

⇩

25 a. If yes, in which field did you invest?

☐ Machinery, ☐ Office Equipment, ☐ Buildings ☐ Software

☐ Training ☐ Advertisement, ☐ Marketing ☐ Hardware

☐ Other _____

26.. Will you expand your business? 1 yes Go to Q 4b
If No 2, go to 26a.

26a. Explain the reason why not? (Check boxes)

1	Low Income	
2	No profit	
3	Lack of fund	
4	Inadequate production capacity	
5	High labor cost	
6	Lack of raw material	
7	High operation cost	
8	Pressure of law/regulation	
9	Low production/no quality	
10	Lack of new technology / expertise	
11	Inadequate production equipments / tools	
12	Other Specify ---	

26b. Which Region of Armenia?
Yerevan ……. 1
Other Please Specify …….

(***For office use only)***

27. Do you have any problem with competitiveness? 1 yes, 2 no ☐

27a. What are the main problems for your business to compete with others?

Low quality of own product/service……1 ☐

Too small scale of production……2 ☐

Unit cost/price of product/service……..3 ☐

Unequal treatment by authorities……..4 ☐

Other, specify.....5 ☐

External Financing

28. Did your business receive any finance? 1 yes, 2 no ☐

28a. From what sources (multiple answers possible)?
Check the appropriate boxes.

1	From suppliers		5	From banks	
2	From family members		6	From micro-credit schemes	
3	Venture Fund		7	From other sources others _____	
4	From Angel Investor		8	Equity Investment	

29. If you are going to expand your business, do you need finance? 1 yes, 2 no ☐
……

30. How much finance do you need for expand your business (in millions AMD)?

AMD	

31. From what source do you expect this finance?
Check the boxes

1	From suppliers		5	From banks	
2	From family members		6	From micro-credit schemes	
3	Venture Fund		7	From other sources others _____	
4	From Angel Investor		8	Equity Investment	

4.2 Questionnaire on Hardware

Hardware, Wholesale, Assembling and Repair Services

Company name	
Director	
Address	
Phone	
E-mail	
URL	
Year company establishment	Year ☐☐☐☐

1. Reporting period From .....to.....

2. Does the company have foreign shareholder ☐ ☐ Yes If no, go to B1.

3. What is the foreign ownership share in the total equity capital in your company (in %)?

Country 1		Country 2		Country 3	
	%		%		%

4. Activities of establishment

Main business activity

5. Please describe the activity nature of the enterprise based on the goods manufactures, sales and repairing:

_____

_____

_____

6. Please check the **three major activities** for hardware manufacturing, assembly, wholesale and repair services and the percentage these represent.

		Check Activity	Percentage Share of total revenue generated
i	Manufacturing of electronic components and boards		
ii	Manufacturing of computers and peripheral equipment		
iii	Manufacturing of communication equipment		
iv	Wholesale of computers, computer peripheral equipment and software		
v	Wholesale of electronic and telecommunications equipment and parts		
vi	Wholesale and Assembling of computers		
vii	Repair of computers and peripheral equipment		

viii	Repair of communication equipment		
ix	Other, Please Specify.....		

Employment

7. Kindly provide the information regarding persons involved as of September 2012

Employment status		Male	Female	Total	Average Number of Experience (Years)	Average Wages per Month AMD
Owner/Director						
Employee i) Management Staff						
ii) Technical /Professional Staff	Masters Degree and Higher					
	Bachelors Degree					
	Secondary/Vocational					
	Under Study/Student					
iii) Sales/marketing Staff						
Part-time Staff						
Contracted Staff						
TOTAL Employees						

SALES OF ICT GOODS AND SERVICES

8. What were your sales of telecommunications equipment? AMD

9. What were your sales of computers and related equipment? AMD

10. What were your sales of electronic components? AMD

11. What were your sales of electronic devices and equipment? AMD

12. What were your sales of other Information and Communications Technology (ICT) goods, not entered in questions 9 to 13? 14.

AMD	

13 What were your sales from renting out or leasing out ICT equipment (without operators)?

AMD	

14. What were your sales from assembling IT equipments & wholesale of equipments?

AMD	

15. What were your sales of IT technical support services?
(Includes repair and maintenance, routine testing of hardware, maintenance and troubleshooting of software or hardware, provision of software patches and upgrades, management and monitoring of a client's IT infrastructure (ie hardware, software, networks), day-to-day management and operation of a client's computer system, transforming information from one format or media to another, and data or disaster recovery services)

AMD	

16. What is the total sales amount from questions 8 to 15?

AMD	

17. Please provide the information regarding other income (*include items such as interest income, dividends, subsidies, government grants, donations, financial leavings, bad debts recovered, insurance claims, gain on sales of assets and foreign exchange transactions).*

AMD	

AMD

18. TOTAL INCOME (16+17)……

19. What is the export share in total sales in % (question 18)?

20a. Please name the 3 countries where you export to?

	Country 1		Country 2		Country 3	
Export		%		%		%

EXPENSES

21. Total Salaries & Wages of Employees including benefits such as Social Tax etc…… | AMD |

22. Professional and business services fees (e.g., legal, accounting) . | AMD |

23. Subcontract expenses (**include** contract labor, contract work and custom work) | AMD |

24. Office supplies & utilities and telecommunications expenses (**include** gas, heating, hydro, water, telephone and Internet expense). | AMD |

25. Rental and leasing (**include** rental of premises, equipment, motor vehicles, etc.). | AMD |

26. Advertising, marketing and promotions…….. | AMD |

27. All other, please specify…… | AMD |

28. Total expenses (sum of questions 1 to 6)

.

28a. What percentage of total expenses in Q 28 did you spend the import of software, hardware, and other equipment? | | | | on

28c. Please name three countries from where you import.

	Country 1		Country 2		Country 3	
		%		%		%

29. Capital expenditure

Please report gross expenditures in **AMD.** Please include expenditures on capital assets (hardware, software, construction, machinery and equipment) for use in the operations of your organization or lease/ rent to others.

TOTAL CAPITAL EXPENDITURE	**AMD**

Innovation, research, and development and other

30. Kindly estimate the percentage (%) of total revenues generated by new or substantially improved products or services introduced by your firm **during the three-year period 2010-2012** | | |

31. Of your total expenses, please estimate the percentage (%) related to product research and services introduced by your firms. ☐☐

Factors Impeding Growth

32. Kindly provide the information: To what extent will the following factors impede the growth of your ICT services or goods?

	Impediment					Does Not Apply
	Low				High	
	1	2	3	4	5	6
Access to financing						
Strength of competition (e. g dominant companies in the market)						
Government rules and regulations (Customs)						
Government rules and regulations (Taxes)						
Access to industry support (e.g. industry association or government agency)						
Delays in obtaining facilities from backbone supplier						
Delays in obtaining customer's decision to purchase						
Data and transaction security						
Lack of qualified staff						
Staff Turnover						
Ability to attract qualified personnel						
Access to international markets (e.g. tariffs, exchange rate)						
Other (please specify)						

33. How did your business develop in 2012 compared to 2011?

	Increase	Remain the Same	Decrease	Don't know
Output	☐	☐	☐	☐
Turnover	☐	☐	☐	☐
Profit	☐	☐	☐	☐
Number of Employees	☐	☐	☐	☐

34. Did you have some new investment for last year? 1 yes, 2 no (If no, go to Q35) ☐

⇩

34a. If yes, in which field did you invest?

☐ Machinery, ☐ Office Equipment, ☐ Buildings ☐ Software
☐ Training ☐ Advertisement, ☐ Marketing ☐ Hardware
☐ Other _____

35. Will you expand your business? 1 yes, Go to Q36b
If No 2 answer q 36a.

36a. Explain the reason why not? (Check boxes)

1	Low Income	
2	No profit	
3	Lack of fund	
4	Inadequate production capacity	
5	High labor cost	
6	Lack of raw material	
7	High operation cost	
8	Pressure of law/regulation	
9	Low production/no quality	
10	Lack of new technology / expertise	
11	Inadequate production equipments / tools	
12	Other, Please Specify	

36b. Which Region of Armenia do you invest?
Yerevan ……. 1
Other Please Specify …… ☐

(***For office use only)***

37. Do you have any competitiveness-related problems? 1 yes, 2 no ☐

37a. What are the main problems for your business to compete with others?

Low quality of own product/service……..1 ☐

Too small scale of production……...2 ☐

Unit cost/price of product/service……3 ☐

Unequal treatment by authorities……..4 ☐

Other, please specify.....5 ☐

External Financing

38. Did your business receive any external finance this past year? 1 yes, 2 no ☐

38a. From what sources (multiple answers possible)? ☐

Check the appropriate boxes

1	From suppliers		5	From banks	
2	From family members		6	From micro-credit schemes	
3	Venture Fund		7	From other sources others _____	
4	From Angel Investor		8	Equity Investment	

39. If you are going to expand your business, do you need financing? 1 yes, 2 no ☐

40. How much external financing do you need to expand your business (in millions AMD)?

AMD	

41. From what source do you expect this financing? ☐
Check the boxes

1	From suppliers		5	From banks	
2	From family members		6	From micro-credit schemes	
3	Venture Fund		7	From other sources others _____	
4	From Angel Investor		8	Equity Investment	

4.3 Questionnaire on ISP

Internet Service and Telecommunications service

Company name
Director
Address
Phone
E-mail
URL

Year company established Year

1. Reporting period From .....To.....

2. Does the company have foreign shareholders? Y If no, go to B1

3. What is the foreign owners' share in the total equity capital in your company (in %) :

Country 1		Country 2		Country 3	
	%		%		%

Activities of establishment
Main business activity

4. Please describe the activity/ nature of the enterprise based on the service rendere

5. Please check the **three most important activities** Internet/Telecommunications service activities you are engaged in and the percentage of the share of revenues these represent..

Activity	Check Activity	Check Activity	Percentage Share of total revenue generated
1	Wired telecommunications activities		
2	Wireless telecommunications activities		
3	Satellite telecommunications activities		
4	Other telecommunications activities		
5	Internet access and Internet telecommunication services		
6	VoIP service providers		
7	Other, Please Specify		

Employment

6. Kindly provide the information regarding persons involved as of September 2012

Employment status		Male	Female	Total	Average Number of Experience (Years)	Average Wages per Month AMD
Owner/Director						
Employee i) Management Staff						
ii) Technical /Professional Staff	Masters Degree and Higher					
	Bachelors Degree					
	Secondary/Vocational					
	Under Study/Student					
iii) Sales/Marketing Staff						
Part-time Staff						
Contracted Staff						
TOTAL Employees						

Sale of services

7. What were your sales of telecommunication and program distribution services?	AMD	

Include: carrier services, fixed or mobile services, and private network and data transmission services.

8. What were your sales of Internet access and Internet telecommunication services?	AMD	

Include: connections to, and carriage of, traffic on the Internet, carrier services of Internet traffic by one, ISP for another ISP, telecommunication services on the Internet ***Don't include:*** website or email hosting.

9. What were your sales of services from hosting and / or providing Information Technology (IT) infrastructure***?***	AMD	

Include website or email hosting with or without integration of applications (online storefronts, order processing, data warehousing), supporting, hosting and managing business processes for a client (financial transaction / credit card processing, payroll processing, personnel administration, logistics services, help desks, call centre), provision of leased software applications from a centralized, hosted and managed computing environment, data storage and management services, co-location services , video and audio streaming services, computer time share.

10. Please provide the information regarding other income (*include items such as interest income, dividends, subsidies, government grants, donations, financial leavings, bad debts recovered, insurance claims, gain on sales of assets and foreign exchange transactions).*

AMD	

11. TOTAL INCOME (7+8+9+10)……

AMD	

12. What is the import share in total revenue in % (question C3 ?

13. Please name the 3 main import countries and their share (%) in total export.

Country 1		Country 2		Country 3	
	%		%		%

EXPENSES

14.	Total Salaries & Wages of Employees including benefits. Such as Social Tax etc.	AMD	
15.	Professional and business services fees (e.g., legal, accounting)	AMD	
16.	Subcontract expenses (**include** contract labor, contract work and custom work)	AMD	
17.	Office supplies & utilities and telecommunications expenses (**include** gas, heating, hydro, water, telephone and Internet e expenses.	AMD	
18.	Rental and leasing (**include** rental of premises, equipment, motor vehicles, etc.)	AMD	
19.	Advertising, marketing and promotions	AMD	
20.	All other, please specify	AMD	

21.	**Total expenses (sum of questions 14 to 20)**	AMD

21A. Please name the 3 main import countries and their share (%) in total Import

Country 1		Country 2		Country 3	
	%		%		%

Capital expenditure

22. Please report gross expenditures in **AMD.** Please include expenditures on capital assets (software, hardware, equipments construction, machinery and equipment) for use in the operations of your organization or lease/rent to others.

TOTAL CAPITAL EXPENDITURE	**AMD**

Total Internet Access Subscribers

23A. Please estimate how many subscribers you have:

	Number of Subscribers		
	Businesses	**Residents**	**Total**
xDSL service			
Dial-Up service			
ISDN service			
Cable service			
Wireless service			
Other *(please specify)*			
Total Subscribers			

23B. Please provide information on the network coverage percentages in Marzes

Marz	**Broadband**	**Other**
Aragatsotn		
Ararat		
Armavir		
Gegharkunik		
Kotayk		
Lori		
Shirak		
Syunik		
Tavush		
Vayots Dzor		
Yerevan		

Innovation, research and development and other

24. Kindly estimate the percentage (%) of total revenues generated by new or substantially improved products or services introduced by your firm **during the three-year period 2010-2012** ☐☐

25. Of your total expenses, please estimate the percentage (%) related to product research and services introduced by your firms. ☐☐ **%**

Factors Impeding Growth

26. Kindly provide the following information: To what extent will the factors described below impede the growth of your ICT services or goods?

	Impediment					Does Not Apply
	Low				High	
	1	2	3	4	5	6
Access to financing						
Strength of competition (e. g dominant companies in the market)						
Government rules and regulations (Customs)						
Government rules and regulations (Taxes)						
Access to industry support (e.g. industry association or government agency)						
Delays in obtaining facilities from backbone supplier						
Delays in obtaining customer's decision to purchase						
Data and transaction security						
Lack of qualified staff						
Staff Turnover						
Ability to attract qualified personnel						
Access to international markets (e.g. tariffs, exchange rate)						
Other (Please specify)						

27. How did your business develop in 2012 compared to 2011?

	Increase	Remain the Same	Decrease	Don't know
Output	☐	☐	☐	☐
Turnover	☐	☐	☐	☐
Profit	☐	☐	☐	☐
Number of Employees	☐	☐	☐	☐

28. Did you finance new investments during the last year? 1 yes, 2 no (if no skip to Q2 ☐

28a. If yes, in which field did you invest?

☐ Machinery, ☐ Office Equipment, ☐ Buildings ☐ Software
☐ Training ☐ Advertisement, ☐ Marketing ☐ Hardware

☐ Other _____

29. Will you expand your business? 1 yes Go to Q 29b
If No, then go to q 29a.

29a. Explain the reason why not? (Check boxes)

1	Low Income	
2	No profit	
3	Lack of fund	
4	Inadequate production capacity	
5	High labor cost	
6	Lack of raw material	
7	High operation cost	
8	Pressure of law/regulation	
9	Low production/no quality	
10	Lack of new technology / expertise	
11	Inadequate production equipments / tools	
12	Other Specify ---	

29b. Which Region of Armenia?
Yerevan ……. 1
Other Please Specify …… ☐

(***For office use only)***

30. Do you have any competitiveness-related problems? 1 yes, 2 no ☐

30a. What are the main problems for your business to compete with others?

Low quality of own product/service……1 ☐

Too small scale of production…… 2 ☐

Unit cost/price of product/service……3 ☐

Unequal treatment by authorities……..4 ☐

Other, please specify…….…… 5 ☐

External Financing

31. Did your business receive any financing this past year? 1 yes, 2 no ☐

31a. From what sources (multiple answers possible)? ☐
Check the appropriate boxes

1	From suppliers		5	From banks	
2	From family members		6	From micro-credit schemes	
3	Venture Fund		7	From other sources others _____	
4	From Angel Investor		8	Equity Investment	

32. If you are going to expand your business, do you need financing? 1 yes, 2 no ☐
……

33. How much financing do you need for expansion of your business (in millions AMD)?

AMD	

34. From what source do you expect to receive these resources? ☐
Check the boxes

1	From suppliers		5	From banks	
2	From family members		6	From micro-credit schemes	
3	Venture Fund		7	From other sources others _____	
4	From Angel Investor		8	Equity Investment	

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